THE UNIVERSITY OF SCRANTON
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HamSCI NEWSLETTER

FALL **2026**

GET DAILY UPDATES ON SPACE WEATHER!

The HamSCI Personal Space Weather Station (PSWS) provides daily updates to citizen-scientists. To subscribe, go to groups.google.com/g/psws-daily.

To learn more about our Personal Space Weather Station, please visit the HamSCI web page.

HamSCI NEWSLETTERS NOW ARCHIVED

Need to retrieve a past issue of the HamSCI newsletter? Now you can!

Among other projects, Dr. Kristina Collins has also been busy helping to archive the HamSCI newsletters on Zenodo for permanence and citability. Each newsletter gets its own DOI, but there is one DOI that encompasses all of them: https://doi.org/10.5281/zenodo.15257908. Thank her when you see her!

hamsci.org

THOUGHTS ON HamSCI

10 August 2026

I often find myself asking the question, "What makes HamSCI work?" Every time I think about this, I come up with the same answer… it's our amazing community. We have people that truly care about what they do and the people they work with. Whenever I talk with someone about a HamSCI project, I can sense the passion and joy they get from working with HamSCI. I know how much personal satisfaction they receive from the friendships and relationships that HamSCI provides.

In this edition of the HamSCI newsletter, we continue to learn about the people and projects that make our community go. We hear from Dr. Rob Suggs NN4NT, a retired NASA astrophysicist who helps to lead our Meteor Scatter QSO Party effort. We learn about Jesse Alexander WB2IFS, a retired wireless communications and technical knowledge professional, who has done amazing work to promote and educate young people from all backgrounds about amateur radio, radio science, and the electromagnetic spectrum. We meet Rebecca Potter, KE2EBI, a recent University of Scranton physics graduate who wrote her undergraduate thesis using HamSCI Personal Space Weather Station observations of the May 2024 Gannon Geomagnetic Storm. Rebecca is now on her way to pursue an optics PhD at the University of Rochester! These are just a few of the many people who make HamSCI the welcoming community it is.

As we begin the 2026-27 academic year, look out for the ways we are making HamSCI more welcoming for both new and existing members. This year, we are creating "HamSCI Working Groups," which are topic-focused teams that volunteers can join based on their interests. Each working group will have one or two designated leaders to guide these subcommunities of HamSCI. The exact structure of these groups is still being developed, but you can visit https://hamsci.org/working-groups-about for information.

As always, I hope you enjoy this edition of the HamSCI Newsletter and look forward to seeing you "down the log"!

Nathaniel Frissell
73 de Nathaniel W2NAF

HamSCI IN THE NEWS

HamSCI has again been honored with a cover story in QST magazine. The content, contributed by Dr. Nathaniel Frissell W2NAF, focused on the HamSCI Personal Space Weather Station (PSWS) with an explanation of how they work, their distribution, capabilities, and future plans.

The August issue also features an overview and summary of the 2026 HamSCI Workshop held at Central Connecticut State University and the ARRL.

This is the second time that HamSCI has been on the cover of QST — the previous being just a year ago in August 2025.

HamSCI RESPONDS TO THE CLOSURE OF SHORTWAVE TIME SIGNAL STATION CHU

Recently, the Advisory Board of HamSCI sent correspondence to the National Research Council of Canada urging a reconsideration of their recent decision to close the station on June 22, 2026, after over a century of continuous operation. The letter cited CHU's value to the scientific community in the understanding of ionospheric science and urged "NRC to maintain CHU operations as a key enabler of frontier space weather research benefitting both Canada and the international Geospace research community."

The National Research Council of Canada did this to save money by not maintaining old equipment (1960s) which had begun to fail frequently. Unfortunately, this was bad news for our HamSCI ionospheric and propagation studies because our Personal Space Weather Station Network used CHU as a precise radio frequency standard to measure the Doppler shift of the signals refracted by the ionosphere. We still have WWV in Colorado and WWVH in Hawaii, but they are much further from our East Coast hams, and use different frequencies than CHU did. This makes the frequency scale sparser since 3.33, 7.85, and 14.67 MHz can no longer be measured.

HamSCI FEATURED ON WNEP-TV

Dr. Nathaniel Frissell and Kornyanat Hozumi (Kukkai) were featured on a news segment on HamSCI's receipt of $1.2 million in grants for ionospheric research study on plasma bubbles using ray tracing.

View the full story:
https://youtube.com/watch?v=sYrTkaL9dAw

HamSCI AT THE NATIONAL SCIENCE FOUNDATION CEDAR WORKSHOP

HamSCI was well represented at the NSF Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) Workshop, held June 21-26 in Des Moines, Iowa.

Three HamSCI community members (Frissell, Witten, Hauan) spoke during the CEDAR Maker's Club breakout session, and four posters were presented (Sanchez, Frissell, Rodland, Pandey).

Additional details, plus photos, are on https://hamsci.org/article/hamsci-2026-nsf-cedar-workshop

HamSCI LAUNCHES PILOT EDUCATIONAL PROJECT

HamSCI has recently begun a project to work with a group of high school students in the study of space weather. The pilot, with participants from Alabama, Florida, and Texas, is expected to begin in early 2027 with an after-school curriculum involving the study of the ionosphere by using the HamSCI Personal Space Weather Station (PSWS) to provide atmospheric measurements.

Volunteers from both HamSCI and local amateur radio clubs located near the pilot schools are also expected to leverage the HamSCI project to further introduce and explain the use and value of amateur radio as an educational tool to both students and educators.

NOTES FROM ALL OVER

HamSCI has announced the dates for the 2027 HamSCI Workshop. The 10th anniversary workshop will be held at The University of Scranton on April 17-18. It is worth noting that April 18 is World Amateur Radio Day, and April is Citizen Science Month. More details to follow but make sure that you save the date!

The HamSCI team will be at the Huntsville Hamfest on August 22-23 at Von Braun Center South Hall.

HamSCI will also be at the New England HamXposition from August 14-16 at the Best Western Royal Plaza Hotel & Trade Center, Marlborough, Massachusetts.

SCIENTIST PROFILE
ROB SUGGS NN4NT

By Mary Lou West KC2NMC

Rob Suggs NN4NT grew up in Rossville, a small town in northern Georgia. When he went to college at Valdosta State University, he left the foothills behind for trees draped in southern Spanish moss. He eventually lived in New Mexico, Los Angeles, Houston, and now in Huntsville, Alabama.

At 12, his grandmother bought him a small telescope. Then he saw "2001: A Space Odyssey" and "Star Trek," and began following the Apollo program. So, Rob headed for a career in space physics, majoring in astronomy and physics, earning his Ph.D. investigating seasonal effects in the atmosphere of Saturn at New Mexico State University. He has worked for the Aerospace Corporation, Grumman, and NASA on GPS, ISS, and other satellites. He recently retired from NASA's Marshall Space Flight Center in Huntsville, where he initially headed the Meteoroid Environment Office figuring out the risk to spacecraft and astronauts from dangerous punctures. He also led the development of the NASA lunar meteoroid impact program and assembled an observatory to observe those flashes as meteoroids impact the lunar surface. Most of his NASA career dealt with defining and specifying the gamut of space environments for manned and unmanned spacecraft development including ISS, JWST, and Artemis elements.

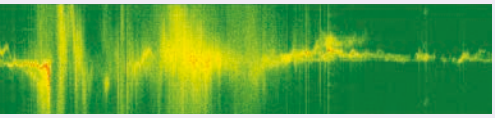
Rob got a ham radio license at 19 and now has his Extra license. He heard about HamSCI from QRZ.COM and an article in QST magazine and has been delighted to join our Meteor Scatter group. His skills in meteor science and ionospheric physics are much appreciated, especially in organizing the recent Meteor Scatter QSO parties and mentoring Nina Tormann in her undergraduate senior thesis at The University of Scranton. The duration of pings can indicate the characteristics of these tiny meteors which scatter radio signals.

Looking ahead, Rob suggests a new HamSCI working group on moonbounce. Attention to the details could tell us something about the properties of the lunar surface. He has access to some powerful antennas through his Huntsville NASA MSFC amateur radio club.

Rob is a science fiction reader and often wonders when he is with his grandchildren what wonders they will see in their lives. As a hobby, he 3D prints toys for them, mainly dinosaurs and atoms.

When you see Rob, ask him about his conversations with astronauts, and how living in microgravity can change your perspective on lots of things.

AN ATLAS OF HamSCI'S PSWS DOPPLER SPECTROGRAMS NOW AVAILABLE!



If you have ever wondered about the interpretation of PSWS Spectrograms, HamSCI is pleased to announce the availability of a new resource! Compiled by Bob Mattaliano N6RFM, "The Atlas of PSWS Doppler Spectrograms" is, as scientists say, a really cool piece of work.

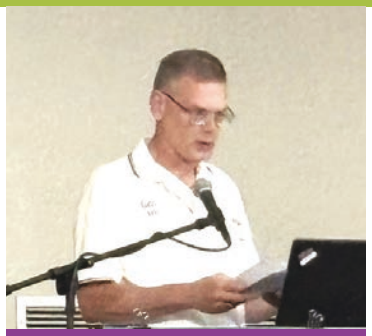
Surf on over to https://hamsci.org and scroll on down to read more about it. https://hamsci.org/article/atlas-hamsci-psws-doppler-spectrograms

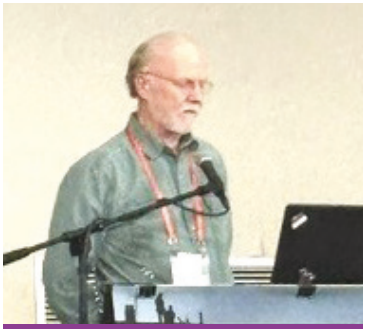
All PSWS operators are encouraged to contribute!

Thanks to all the co-authors on this project for helping to bring this forward, including Gwyn Griffiths (G3ZIL), Gary Mikitin (AF8A), Dave Swartz (W0DAS), and Mary Lou West (KC2NMC) in addition to N6RFM. And to future contributors, thanks in advance!

HamSCI group picture

HamSCI AT DAYTON HAMVENTION


Gary Mikitin AF8A


David McGaw N1HAC

Dr. Kuldeep Pandey

HamSCI FORUM AND RECORD BOOTH ATTENDANCE MARK ANOTHER YEAR AT DAYTON

HamSCI was once again at this year's Dayton Hamvention, which drew many visitors who asked questions, learned about our projects, and made new friendships and renewed old ones. Staffed by our intrepid volunteers, we demonstrated our technology, and our posters described in detail our current efforts to better explore ionospheric science and increase the cooperation between scientists and amateur radio operators.

We participated in a 90-minute forum on Friday morning which included:

- What is HamSCI? (Nathaniel Frissell W2NAF, The University of Scranton)
- Solar Eclipse Through Ham Radio: What the Bands Revealed (Dr. Kuldeep Pandey, New Jersey Institute of Technology)
- A Grape 1 HamSCI Receiver Build Project for Education and Science (Bob Reif W1XP, HamSCI)
- Meteor Scatter QSO Party Participation and Science Results (Gary Mikitin AF8A, HamSCI)
- CINEMA/MOVIE — A NASA Mission to Study the Earth's Magnetospheric Dynamics (David McGaw N1HAC, Dartmouth College)
- An Open Discussion and a Review of the HamSCI Vision.

Nearly 80 people attended the presentation and asked questions. Many returned to our booth afterwards to learn more or to volunteer.

Thanks to all our forum speakers and booth volunteers. Dayton has become an annual "HamSCI Homecoming" and this year's turnout was the largest ever.

FEATURE

STUDENTS LEARN ABOUT HamSCI AT SPSCON 2025

By Ron Kumon K8DTJ and Ruth Willet KM4LAO

From Oct. 30 to Nov. 1, 2025, over 1,000 undergraduate students, faculty, and other professionals gathered in Denver, Colorado, for the 2025 Physics and Astronomy Congress, a.k.a. SPSCon. This triennial event, which is sponsored by the Society of Physics Students (SPS), Sigma Pi Sigma Physics Honor Society, and American Institute of Physics, is the largest meeting dedicated to undergraduate students in physics and astronomy in the country. For the first time, SPSCon featured a "Congress on the Air" special event station, K0P, which was organized and operated by Sigma Pi Sigma member Ruth Willet (Penn State University, State College, Pennsylvania) and SPS President Prof. Ron Kumon (Kettering University, Flint, Michigan). Our goal for the weekend was to connect physics students with hands-on radio technology and cultivate an interest in amateur radio that can hopefully lead to more licensed college-aged students.

Our team constructed a portable HF station in front of the Sheraton Downtown Denver consisting of an Icom IC-7000 and LDG AT-200Pro II Autotuner borrowed from the Penn State Amateur Radio Club, a Bioenno battery, and a tri-band SOTABEAMS antenna and mast. The station was operated during the morning sessions of the congress on Friday, Oct. 31, and Saturday, Nov. 1, and coincided with networking sessions for students. While Ruth and Ron organized the station, there were several other newly licensed attendees at PhysCon who also volunteered their time to help at the station and made their first QSOs on the air. Attendees had the opportunity to see the station, get on the air, learn about the citizen science projects of HamSCI, and receive a copy of the HamSCI newsletter. During our two hours of operation, we were able to make seven contacts from six states and talked to over 40 students during the event.

Ruth Willet (KM4LAO) talks to students about amateur radio at our special event station K0P. (Oct. 31, 2025; photo by Ronald Kumon)

Ruth Willet (KM4LAO) talks to students about amateur radio at our special event station K0P. A temporary mast with a wire antenna is shown on the left. (Nov. 1, 2025; photo by Ashauni Lennox)

AMATEUR PROFILE
JESSE ALEXANDER WB2IFS

Q: How did you learn about HamSCI and how did you get involved? How have you been involved in the past? What is your current involvement?

A: I first met Dr. Nathaniel Frissell and his team during my presentation about the National Radio Astronomy Observatory (NRAO) Ham Radio Project at the ARDC Summit at the 2022 TAPR Digital Communications Conference (DCC). This was indeed a fortuitous meeting because it led to multiple opportunities for students in the NRAO Ham Radio Project. I also presented at the 2025 HamSCI Workshop on inclusion and the status of the NRAO project.

My team at NRAO and members of HamSCI and the amateur radio community helped launch 17 new BIPOC and LGBTQIA+ amateur radio operators into the electromagnetic spectrum before the project was cut short due to recent administrative changes.

Q: What HamSCI projects interest you?

A: The Personal Space Weather Station is most interesting to me given that it would complete the suite of weather instrumentation that I already have at my home. I currently have a Davis Vantage Vue Wireless Weather station that broadcasts data on APRS network, and the Weather Underground.

L to R: Jesse Alexander WB2IFS, Steve Bible N7HPR, Ed Dunlop N3ED, and Dr. Nathaniel Frissell W2NAF.

Q: What skills do you have that are best suited to HamSCI? How might other amateurs obtain similar skills?

A: I am skilled in technical communications, knowledge management, and electrical engineering. As all these fields are feeling pressure from the AI boom and given the tragic bias against STEM fields in this country, I would recommend that students learn how to learn by leaning into their propensities and personal superpowers. I am a visual, auditory, and tactile learner. I learned to translate prose into pictures that best fit my visual learning style. This is a skill I picked up in high school and carried through college and into the corporate workplace. I never stop learning. I would also recommend learning how to write without using AI to generate content. This way you will be better equipped to defend and refine your work when it is challenged. You can best perfect content that you create.

Q: What type(s) of equipment do you have in your shack? Antennas?

- Icom IC-7300 for HF (FT8, SSB, and CW)
- Kenwood TM-D710G for APRS
- HF Signals uBITX V6 for POTA work
- Yaesu FT-1802 for an APRS-IGATE
- Yaesu FT5D HT
- TYT TH-9000D 220MHz radio
- openSPOT3 for C4FM and digital VHF/UHF work
- Antennas: Windom for HF work 10-80m, J-pole for 2m/1.25m/70cm, “repeater base station” ground plane for 2m/70cm, and portable MFJ apartment antenna for POTA

Q: How active a ham would you say you are? When were you first licensed? License class?

A: I am active on the OMIK digital and VoIP nets, and I am busy getting the HBCUs on the Air project on the air. I was first licensed as WN2IFS in 1975 in Montclair, New Jersey. I hold an Extra Class license.

The NRAO "away team" to HamSCI 2024: Abigail Swanberg KQ4MHA, Erin McDonald KQ4IES, Nejon McBride KJ5AXD, Jesse Alexander WB2IFS, Danielle Rowland, NRAO program director, Mia P Bridges KQ4MGZ, and Xander Whittington-Speck KJ5DDU.

Q: What would you say is the future of HamSCI? What should HamSCI be doing to increase its awareness and provide more value to you as a ham?

A: As a knowledge manager (retired), I am concerned about the preservation of data from science work done in this country given the current climate of distrust of scientists and engineers. Because HamSCI has an international focus, it could and should consider offshoring the knowledge it is creating to knowledge bases outside of the U.S.

I would also like to see HamSCI consider STEM-based DX-peditions outside of the U.S. — particularly in the Global South — Central and South America, the Caribbean, and Africa. These DX-peditions should focus on leaving behind skills and material to allow research to continue outside of the United States.

This is like the focus of the HBCUs on the Air project I am working on through the OMIK organization. We are endeavoring to create a network of self-sustaining stations at HBCUs both within this country as well as outside of it.

HamSCI paid for our first NRAO Ham Radio "away team" to HamSCI 2023. Pictured are Jesse Alexander WB2IFS, Sullivan Gutierrez Torres, Logan Slimp, and Nejon McBride KJ5AXD.

Q: Finally (and importantly) a brief bio about yourself and your contribution to HamSCI as well as to scientific research.

A: I am a science, technology, engineering, art, and mathematics (STEAM) storyteller who spotlights the essential contributions of people of culture (POC) to wireless communications and STEAM subjects in general. I have a lifelong curiosity about the electromagnetic spectrum as a natural resource. I enjoy creating curricula, visual communications tools, and non-linear documentation based on experiences hacking wireless systems. I'm particularly curious about open-source tools, systems, and projects.

I am a senior life member of the Institute of Electrical and Electronics Engineers (IEEE), a member of Radio Club of America Inc. (RCA), American Radio Relay League (ARRL), the OMIK Amateur Radio Association, a poet, and Life Member of Alpha Phi Alpha Fraternity, Inc.

For 17 years, I was a member of the technical staff at Bell Labs, where I worked on the Advanced Mobile Phone System (AMPS) and the first digital cellular networks — 0 through 2.5G systems.

I am an award-winning poet, maker, hacker, tinkerer, and volunteer emergency communicator. I graduated cum laude and Tau Beta Pi with Bachelor of Science and Master of Engineering degrees in electrical engineering from Howard University, Washington, D.C., specializing in wireless communications.

Find Jesse's ham radio origin story video: **youtu.be/8OmtCZkLDiw**

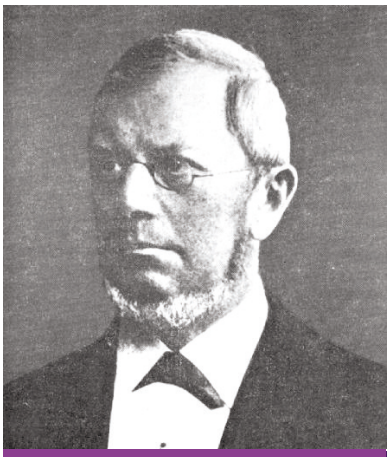
FEATURE

THE MAUNDER MINIMUM

By Ron Wilcox KF7ZN

In 1858, one of our earlier astronomers finished his schooling in mathematics and astronomy and then began teaching school. At the age of 36, he began to do solar observations. He did many observations of sunspots and studied them, ending up with two key areas of research and a new, more in-depth look at two areas of astrophysics. As a result, a law related to these findings was named after him. Our first subject in this article is Gustav Spörer, who made these series of observations and studies of the sun and sunspots.

Annie Scott Dill Maunder (née Russell)



Gustav Spörer

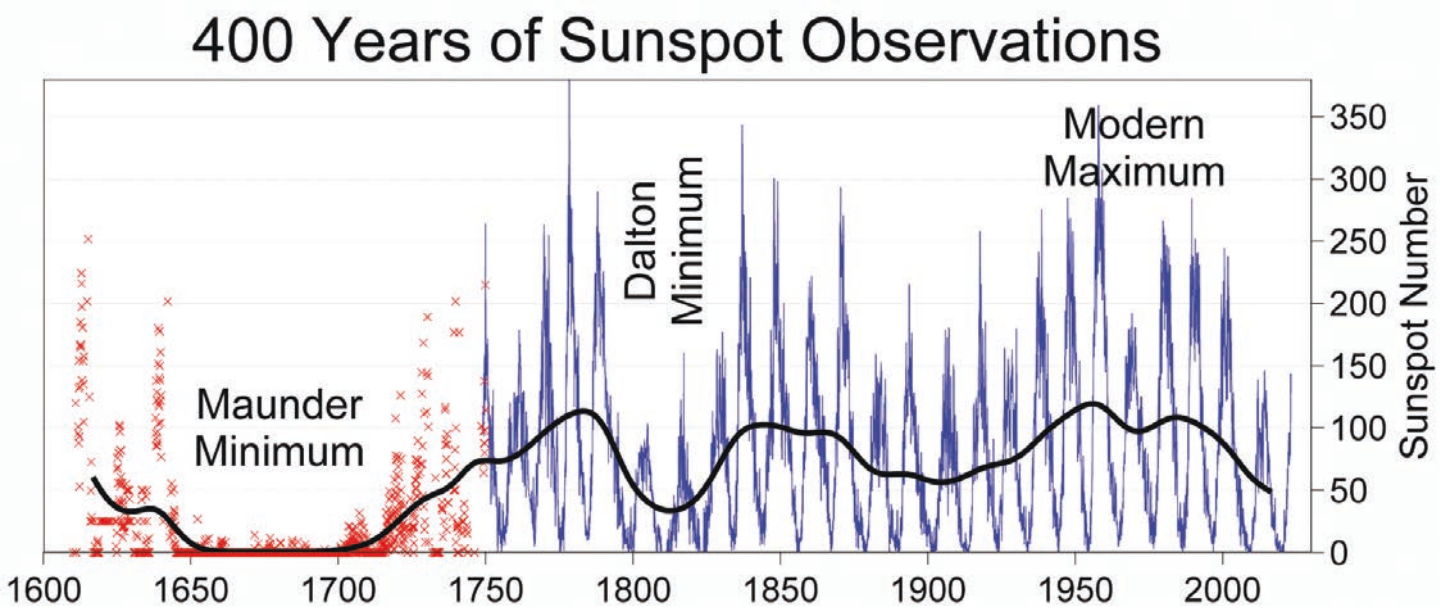
The first area is related to the differential rotation of the sun (due to the sun being a ball of hot plasma, rather than solid, its equator spins faster than its poles).

The second area was built on studies done by another name famous for solar physics — Richard Carrington, who in 1852 decided to build an observatory at his home in Redhill, England. This afforded him the time and opportunity to study the sun during the day and the stars at night. He decided that he would do an 11-year study of one complete cycle of the sun's activity. However, he was only able to complete seven and a half years of it, but with his work came a detailed look at the rotation of the sun, and the migration of sunspots equatorially. Spörer added to this knowledge of the sunspot's migration. In fact, this work that he did and his discovery is what I alluded to earlier, called Spörer's Law. Carrington went on to have his name linked to the "Carrington Event," a famous solar storm.

Starting in 1882, Spörer began to study the available historical records on solar activity. In 1887, he was convinced that there was a lack of activity in the 17th century. From this came the discovery of a period in which a minimum of sunspots and solar activity occurred from 1645 to 1715. He published this work, which was relayed to the Royal Astronomical Society. Surprisingly, there was not much interest generated in the paper or the research.

Shortly after this, Edward Walter Maunder and his wife, Annie, were also studying sunspot movement. As part of their research, they were looking at sunspot activity historically and found a time with almost no sunspot activity. They wrote two papers, one in 1890 and one in 1894, in which they cited the papers and the work of Spörer. This time there was quite a bit of interest. Eventually, this period came to be called the "Maunder Minimum." As a side note, because his wife Annie did not have a degree, her contributions were not allowed to be recognized.

I found a few references calling the period from 1645 to 1715 the "prolonged sunspot minimum,"



but most of the time it is called the Maunder Minimum after Edward Walter Maunder. The term was popularized by John Eddy in a paper published in 1976.

So how much of a minimum was there? During the period of 27 years from 1672 to 1699, there were only 50 sunspots found in the historical literature. While the exact number of sunspots in a comparable span of years varies, the average is 40,000 sunspots. I did not find any data supporting just one of the different explanations of why the minimum occurred, but one thing I did find of interest was John Eddy's paper where he concludes that the solar corona was weak in intensity and unstructured. For the citizen scientists, the corona is the outermost part of the sun's atmosphere. It is usually hidden by the bright light of the sun's surface, making it hard to see. However, the corona can be viewed during a total solar eclipse. There is a lot of eclipse information on our HamSCI website. There were three eclipses during the Maunder Minimum, in 1652, 1706, and 1715. This is how the conclusion about the corona was reached. Oh, and while this article does not delve too deeply into Dr. Eddy, his is another interesting series of scientific work for another day.

Some other interesting tidbits that I learned include data that the sun's surface rotation slowed in the deep Maunder Minimum and there are conflicting conclusions about how normal the frequency and strength of auroras were during the minimum. The Maunder Minimum is not the only period of significant inactivity in the sun. There have been roughly 18 periods of sunspot minima in the last 8,000 years.

One last item concerns the "Little Ice Age" which occurred in Europe and North America. I found two periods of time assigned to this cooling period. The most common is from the 16th to the 19th centuries, but I also found quite a few with a timespan from about 1300 to about 1850. This means that the Maunder Minimum occurred in the middle of the Little Ice Age. Whether or not there is a cause and effect from the decreased solar activity is beyond the scope of this short article. However, there seems to be a consensus that volcanic activity was a prime force behind the temperature changes. There are also significant studies by NASA and other sources that delve into relationships with the sunspot minimums and the cooler temperature in greater detail.

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STUDENT PROFILE
REBECCA POTTER KE2EBI

By Emma R. Moran

Across the wide range of universities that participate in HamSCI, I believe there is one thing all academics would agree on: some of the best and brightest of these departments are the undergraduates, who research tirelessly while attending their courses, running clubs, and hopefully, sleeping. (Hopefully! I graduated a year ago and remember the sins I committed against my sleep schedule during that time.) And while we all know this, sometimes their work is overshadowed next to their more established professors. To bring the work of a talented student into the spotlight, I chatted with Rebecca Potter about her work with HamSCI throughout her undergraduate career.

As we sit down over Zoom, Rebecca tells me that physics had not always been the plan — in fact, back in high school, she recalls doing everything in her power to avoid taking her recommended physics course. Despite her efforts, she ended up in the class, but if you asked her now, she would agree that it was for the best. It was in that class that she fell in love with physics, after all. From there, she would declare it as her major as she started her undergraduate program at The University of Scranton. (She would also major in philosophy and minor in math.)

Rebecca would be introduced to HamSCI during her first year, when Dr. Nathaniel Frissell spoke to her freshman seminar as a guest lecturer. That talk sparked her interest in astronomy, which tied together neatly with the geophysics done by HamSCI scientists. When it became time for her to begin her own research in her sophomore year, she set out to join Dr. Frissell's team.

After earning her technician class license (her callsign is KE2EBI, if you ever run into her on air), she joined The University of Scranton's Amateur Radio Club, W3USR, and became an active member of the club as its vice president. After familiarizing herself with ham radio, she began aiding HamSCI's effort to deploy personal space weather stations (PSWSs) to Antarctica, working on logistics such as selecting the host sites. As part of that project, she became familiar with the PSWS instrument itself, joining the team that installed the PSWS station at K3LR.

As part of Dr. Frissell's team, Rebecca would travel to the 2025 Dayton Hamvention and attend that year's Contest University. One of that year's speakers was Dr. Tamitha Skov, a solar and space physicist known for her space weather forecasting work under the moniker of the Space Weather Woman. Her lecture about her predictions for how solar cycle 25 will affect amateur radio propagation intrigued Rebecca, and she sought out Dr. Skov after her talk. While in conversation, Dr. Skov brought up the Gannon Storm, the most powerful geomagnetic storm to affect the Earth in more than three decades, and mentioned that it would be interesting to investigate PSWS observations of the storm.

Rebecca immediately dove into the work: she began combing through PSWS observations of the storm right there at Hamvention, sitting at the HamSCI booth at the Greene County Fairgrounds with her laptop firing away. The project would grow and grow, and eventually Rebecca would choose it as her undergraduate thesis work.

I was fortunate enough to see Rebecca defend said thesis, and it was an excellent talk. By analyzing 15 MHz observations from WWV and WWVH to the PSWS at W2NAF (Dr. Frissell's station) for four days surrounding the Gannon Storm, she extracted the Doppler shifts of HF transmissions (as HF signals reflect off the ionosphere, changes in ionospheric region heights, such as due to a geomagnetic storm, can cause Doppler shifts in the observed transmissions). She revealed high Doppler shifts during the Gannon Storm and in its immediate aftermath before the Doppler shifts decreased throughout the recovery phase. Her work confirmed that the PSWS can be extremely useful for geomagnetic storm studies and pointed to how future work can take these observations and extract ionospheric conditions.

Rebecca has also worked on research outside of HamSCI: at a research experience for undergraduates (REU) at Stony Brook University in the summer of 2024, she studied the relationship between the number of globular clusters in

ultra-diffuse galaxies and their masses. It was a different experience from working with HamSCI. She recalls at her REU she worked with a small team of astrophysicists, compared to HamSCI's much wider collaboration. As she reflects, she tells me that she has realized the many advantages she has gained from the former: she has learned not just physics, but also the instrumentation behind the science. She has also learned how to communicate her research to a wide audience, from fellow physicists to citizen scientists who never sat in a university lecture hall, which I believe is a critical skill for an early-career researcher to have.

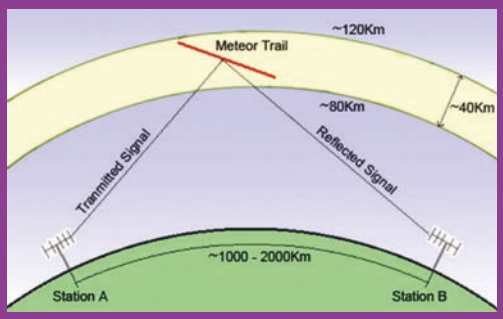
She has now graduated, and on to the next step forward: a Ph.D. program in optics at the University of Rochester. It is a new venture for Rebecca, but one she is excited for, she tells me. The program offers research opportunities in both theory and instrumentation, and with the wide skillset her time in HamSCI has gifted her, she could confidently take either path. She is not sure which she is choosing just yet. She is taking the summer off first, and after all she has accomplished, I think we can all agree that she has earned her break. But keep your eye out for her name — I personally cannot wait to see it across the top of many papers in the future.

2026 METEOR SCATTER QSO PARTIES: MORE SCIENCE ON THE HORIZON

By Gary Mikitin AF8A

HamSCI is again sponsoring a series of Meteor Scatter QSO Parties (MSQPs) in 2026/early 2027. There is a great deal of interesting science to be discovered via this unusual, but easily operated, digital mode. Simply put, meteor scatter (MS) communications occur when signals transmitted by hams are reflected to Earth, often far past the horizon. They reflect off the ionization trails left by the dirty, dusty, and icy remnants of asteroids and comets as these tiny particles undergo ablation when encountering the Earth's atmosphere.

Meteor Scatter Explanation



To recap 2025's two MSQPs, we emphasized amateur radio's newly obtained access to MS operating on the 10-meter (28 MHz) band. Ten meters is interesting because the wavelength is 66% longer than the most popular MS band, six meters (50 MHz). Wavelength is important because many of the long-accepted formulas for key communications parameters, such as reflected signal power and reflected signal duration, are thought to vary by the wavelength cubed and squared, respectively.

Aside from waking up early on event days to operate their radio gear, HamSCI members (led by Rob Suggs NN4NT and Jay Weitzen AC1SN) met weekly to discuss the scientific value of, and the analytical approach for, the data generated by the 130 participants. Much of the analytical work was done by Nina Tormann KD3BJV as part of her bachelor's thesis in physics (advised by Nathaniel Frissell W2NAF).

Nina's work, and our 2025 efforts, were just the beginning of what should be fruitful exploration of MS propagation. In order to generate a much larger data set, HamSCI is encouraging operation and data collection during six different showers in 2026 — (the Eta Aquariids, Daytime Arietids, Southern Delta Aquariids, Perseids, Geminids, and the Quadrantids) — monthly from May to the first few days of 2027.

Whether you are a seasoned MS veteran, or an MS rookie, we encourage you to participate as a monitor station or as a transmitting/receiving station. Either way, familiarize yourself with the commonly used MS software, WSJT-X, which allows you to operate the MSK144 digital mode. Be sure to collect audio (WAV) files of all received signals, and upload them to HamSCI's data collection site, Zenodo.org. Full details on event schedules, operating hints, data collection procedures and past results can be found at hamsci.org/msqp.

JOIN HamSCI

We welcome you to join the HamSCI community! We are a group of amateur radio operators and scientists working together to study the ionosphere and further amateur radio. HamSCI consists of many different types of projects accessible to a variety of skill levels with various focuses on science to engineering to pure amateur radio.

The easiest way to participate in the HamSCI Community is by joining the HamSCI Google Group. The HamSCI Google Group is an e-mail discussion forum to facilitate communication between hams, the professional space and atmospheric science communities, and anyone else interested. When requesting to join, please include some information about who you are and why you would like to join. WELCOME!!

ABOUT CITIZEN SCIENCE

Citizen science is scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions.

HamSCI engages amateur radio operators to help with the collection and analysis of data to help better understand the changing conditions of "space weather" within the ionosphere. As a HamSCI citizen scientist, you help collect valuable scientific data that can make a meaningful impact to scientific research.

HamSCI collaborators gratefully acknowledge the funding of NSF AGS-2045755, AGS-2432821, AGS-2432822, AGS-2432823, AGS-2432824, AGS-2431666, OPP-2332427, NASA 80NSSC25K7026, 80NSSC23K1322, 80NSSC26K0051, Frankford Radio Club and ARDC grants.

The HamSCI silhouette photo is by Ann Marie Rogalcheck-Frissell KC2KRQ. Newsletter design by Vikki Lawhon, University of Scranton Creative Services.

WHAT IS HamSCI?

HamSCI, the Ham Radio Science Citizen Investigation, is a platform for the publicity and promotion of projects that are consistent with the following objectives:

- Advance scientific research and understanding through amateur radio activities.
- Encourage the development of new technologies to support this research.
- Provide educational opportunities for the amateur community and the public.

HamSCI serves as a means for fostering collaborations between professional researchers and amateur radio operators. It assists in developing and maintaining standards and agreements between all people and organizations involved.

HamSCI was started by ham-scientists who study upper atmospheric and space physics. These scientists recognized that projects such as the Reverse Beacon Network, WSPRNet, PSKReporter, DX Cluster, ClubLog, and others are generating big data sets that could provide useful observations of the Earth's ionosphere and related systems. Because of this, HamSCI's initial focus is on these fields of research. In the future, other researchers may join HamSCI and broaden its scope.

For scientists, working with the amateur radio community is a way to access individually managed stations, available by the hundreds in dozens of countries, with receive and transmit capabilities across the electromagnetic spectrum, easily identified in areas of interest and deployed to remote locations, for free.

RECENT HamSCI PRESENTATIONS

HamSCI's Thursday meetings often feature presentations by prominent scientists and amateurs that provide context to the weekly discussions.

Check the link for recent contributions from our members.
https://hamsci.org/telecons

Join our mailing list to be notified of upcoming topics and speakers.

HamSCI WEEKLY MEETINGS

There are numerous ways to learn about and participate in HamSCI activities. We meet three times a week on various aspects of our work:

TAPR/HamSCI Technical Session: This weekly telecon is hosted on Mondays at 9 PM Eastern by TAPR and The University of Scranton to support collaborative HamSCI-TAPR design and hardware projects.

PSWS Session: This weekly telecon is on Thursdays at 10 AM Eastern hosted by Case Western Reserve University to cover operational aspects of the Personal Space Weather Station network.

The HamSCIence Telecon: Weekly telecon on Thursdays at 4 PM Eastern to discuss data collection, analysis and conclusions related to HamSCI's scientific research efforts. All backgrounds, including researchers, data analysts and citizen scientists, are welcome and encouraged to attend. On the second Thursday of each month there will be an invited speaker.

HamSCI Partners:

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For inquiries and submissions please contact us at **hamsci@hamsci.org**.